

Multi-Layered Integrated Airframe System, Phase I

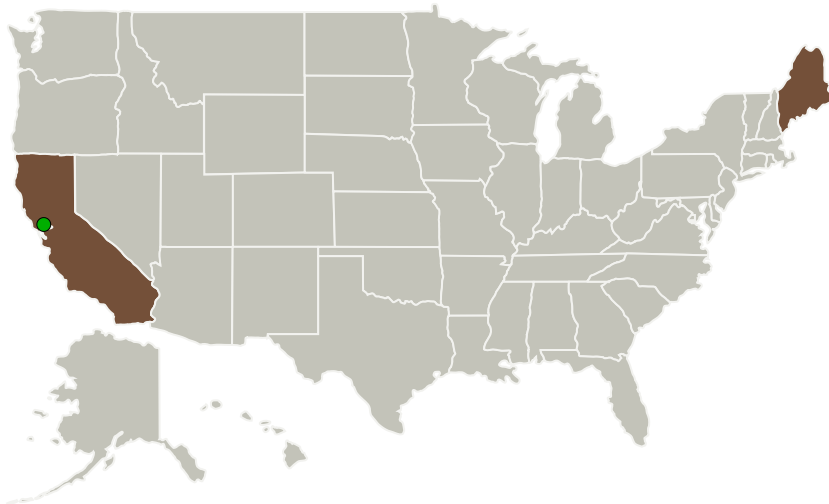
Completed Technology Project (2010 - 2010)



Project Introduction

NASA has a need to develop higher performance ablative thermal protection systems (TPS) than is currently available for future exploration of our solar system's inner and outer planets. Potential missions for these new and/or improved TPS materials include Mars Entry, Descent & Landing, and Mars Sample Return, but the general desire is that these new technologies be capable of cross-cutting mission applications. In addition to improved TPS performance, NASA also has a need for TPS integrated with the sub-structure that will improve thermal efficiency, insulation performance, system thermal-structural performance, and system integrity with the goal of achieving increased system reliability, reduced areal mass, and/or decreased costs over the current state-of-the-art (SOTA). This program will address NASA's need to: 1) Develop higher performing TPS materials to meet the demands of severe mission trajectories such as Mars Sample Return; and 2) Integrate TPS materials with the sub-structure to improve overall robustness and decrease mass. This program's goal is to extend Phenolic Impregnated Carbon Ablator (PICA, TRL=9) and Integrated Composite Structure (ICS, TRL=5) TPS materials to a broader range of flight heat fluxes and performance to address future missions and heatshield designs. The current TRL for the multi-layered TPS system is 3, with an envisioned TRL of 6 at the completion of a successful Phase II program.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Fiber Materials, Inc.	Lead Organization	Industry	Biddeford, Maine
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Maine

Project Transitions

**January 2010:** Project Start**July 2010:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140124>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Fiber Materials, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

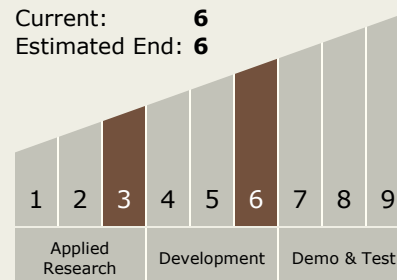
Carlos Torrez

Principal Investigator:

Benjamin Dwyer

Technology Maturity (TRL)

Start: 3
 Current: 6
 Estimated End: 6



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.2 Structures
 - └ TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System